



Forum for the **Future**

Analysing the Business Case for Sustainable Rail

December 2005

Commissioned by:



Rail Safety & Standards Board

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The need for action

Sustainable development is becoming a key paradigm for the 21st century, finding growing resonance throughout UK and EU public policy and increasingly embraced by global business. It is an overarching concept that seeks to explain how social well-being, economic prosperity and the environment all need to be protected and enhanced in an integrated fashion, for the sake of both current and future generations.

There are numerous indications that sustainable development will increasingly become the 'organising principle' against which government, societal and business activities will be judged. For example, the UK Government has recently published a new sustainable development strategy¹ that requires all central Government departments and their executive agencies to produce focused action plans based on the strategy. In particular, there is growing concern about the global threat of climate change, with the UK government promoting the issue at the G8 and during its presidency of the EU in 2005.

Many parts of the business sector are also beginning to respond to the sustainable development agenda using sophisticated and strategic approaches. For example, at both a company and an industry level, the aviation, oil and gas, motor, water, and energy sectors are all starting to publicly respond to this challenge through stakeholder engagement and communication exercises. These are increasingly complemented by specific corporate or sectoral strategies, underpinned by suites of sustainability objectives and targets.

The rail sector has a strong case to make regarding its contribution to the efficient, accessible, reliable, affordable and clean transportation of people and goods, a service that is central to the operation of a modern society and economy. There are signs, however, that despite numerous examples of good practice, the industry has not fully grasped the opportunity to outline a compelling vision for a sustainable railway, and a complementary strategy to deliver it.

In the absence of this, there is a risk that growing legislative pressures, increasing energy costs, changing stakeholder expectations and shifting government economic priorities could conspire to undermine rail's place at the heart of our transport system.

Window of opportunity

In many ways, however, the time is ripe for the industry to embrace the challenge of sustainable development. The current restructuring of the sector following the passing of the Railways Act provides an opportunity to embed sustainability principles into the new governing framework. Now that Government has taken charge of setting the national strategy for the railway, it will need to demonstrate how this feeds into and supports its new overarching sustainable development strategy. Likewise, with their increased decision-making powers, the Scottish Executive, National Assembly for Wales, the Passenger Transport Executives and Transport for London will also all have an opportunity to influence the way in which rail supports the sustainability outcomes they seek in their areas.

While the Strategic Rail Authority had a duty "to act in the way best calculated to contribute to the achievement of sustainable development", it was unclear what impact this had on decision-making and how it translated into changed operations.

There appeared to be something of a vacuum in which Government, the statutory bodies and the industry itself were all aware of the need to address sustainability challenges, but had collectively failed to build a compelling case for action.

This paper suggests that currently there is an excellent window of opportunity for all the principal rail stakeholders to demonstrate a renewed and united commitment to sustainable development as they start to plan the future of the railway. The next sections unpack what is meant by sustainable development and why it's increasingly becoming a core business agenda.

Sustainable development explained

Definitions

Although it is a multifaceted concept with numerous definitions, at its heart sustainability simply refers to “capacity for continuance into the long-term future.” Forum for the Future regards **sustainable development** as the process by which organisations move towards **sustainability**.

“Sustainable development is a dynamic process which enables all people to realise their potential and to improve their quality of life in ways which simultaneously protect and enhance the Earth’s life support systems.”

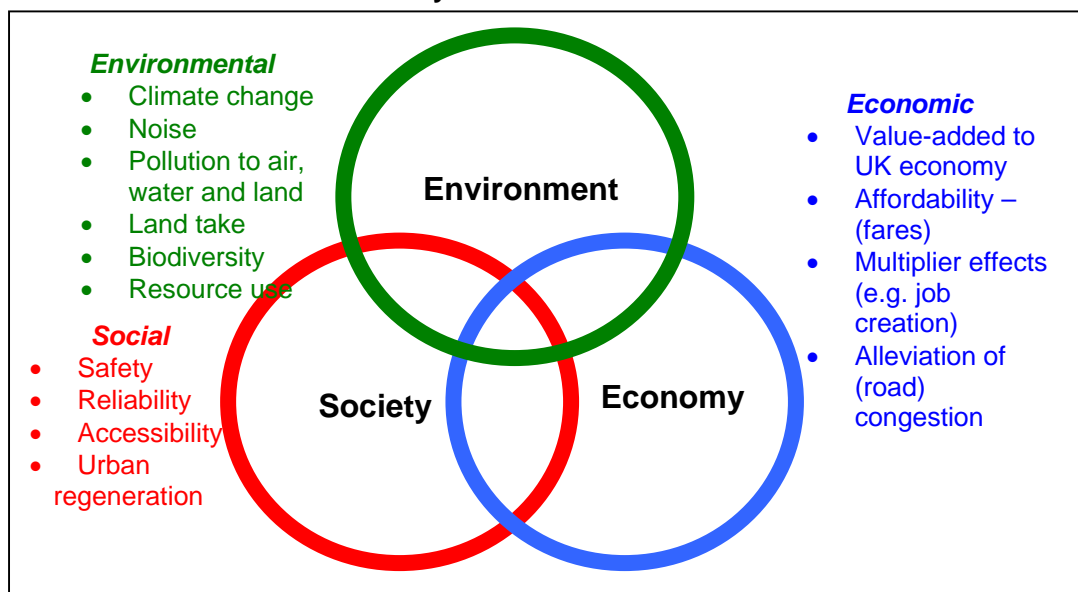
One of the most commonly used definitions emerged from the findings of the World Commission on Environment and Development (WCED), set up by the United Nations in 1983, and published as The Brundtland Report (Our Common Future) in 1987:

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The three dimensions of sustainability for rail

The figure below maps out some of the key sustainability issues for rail across the environment, the economy and society. Central to the achievement of sustainability is an approach to development in which trade-offs between the three areas are minimised and integrated benefits are maximised. For example, highly efficient engine technologies can minimise costs through decreasing fuel use, minimise environmental damage by lowering carbon emissions, and minimise harmful health impacts by reducing air pollution.

Three dimensions of sustainability for rail



Many companies and sectors are now taking a sophisticated approach to mapping their activities across this 'triple bottom line'. This enables them to examine their progress towards sustainability, accounting not just for their financial performance, but also their impacts on society and the environment. A common approach is to develop a sustainability vision, underpinned by a strategy which outlines the key economic, social and environmental objectives needed to deliver it, as well as the shorter-term targets and performance indicators through which improvement can be measured and communicated.

This type of approach is now being adopted by organisations as diverse as the Society of Motor Manufacturers and Traders (SMMT), The United Kingdom Offshore Operators Association (UKOOA), and Water UK². Individual companies such as BAA and Vauxhall Motors also have a long history of producing detailed sustainability reports or reviews.

Why it's a core business agenda

There is increasing evidence to suggest that companies and sectors that successfully identify and manage their sustainability impacts find favour with customers, government and investors. For rail, this 'business case' covers numerous issues built on maximising opportunity and minimising risk:

Business case summary

Business Case for Sustainable Rail	
<p>Maximise Opportunity</p> <ul style="list-style-type: none"> • Improve cost control and process efficiency • Invigorate industry, attract the 'best talent' and generate innovation • Improve public perceptions • Secure role in integrated transport system • Uphold case for subsidy 	<p>Minimise Risk</p> <ul style="list-style-type: none"> • Improve declining reputation • Manage increasing energy costs • Address regulatory and legislative pressure • Combat tendency for being reactive and compliance-driven • Reduce loss of custom to competitive modes • Reverse public / government loss of faith

Opportunities

To take just one area, 'eco-efficiency' – minimising costs through maximising resource efficiency – there are numerous examples from the rail sector of these 'win-win' situations where environmental and financial benefits go hand in hand. For example:

- EWS has made significant cost savings simply through altering its idling policy and thus saving on fuel costs and eliminating unnecessary emissions
- Network Rail has installed an oil treatment plant to recycle waste transformer oil thus reducing its waste impacts while also generating cost savings of £37,000³
- Deutsche Bahn has an ongoing project to reduce the energy consumption of traction by 10% through training in energy efficient driving techniques, with a potential annual saving of over €60m (on a total energy cost of €700m)⁴.

Risks

There are also 'cost of compliance' risks however, particularly from legislation designed to maximise environmental protection and equality of opportunity for all. For example:

- The Non-Road Mobile Machinery Directive - exhaust emission limits for local air pollutants are set to apply to diesel locomotives from 2007. These will be phased in and start to affect most engines and locomotives by 2009, with more stringent limits introduced in 2012⁵. Studies conducted for the Strategic Rail Authority (SRA) suggest the cost to the industry could run into hundreds of millions of pounds.
- Disability Discrimination Act 2005 – this Act requires disabled access to be considered throughout the network, from rolling stock to stations and signage.
- UK Oil Storage Regulations – UK legislation requiring minimum standards for oil storage facilities have a very significant impact on the railway as they apply to all of the depot facilities used for storing. Studies conducted for the SRA suggest the cost to the industry could be between £10m - £100m.

The selection of issues above, covering facets of the sustainability impacts of rail, demonstrate that environmental and social issues are becoming inextricably linked to core business success. Those organisations that best understand and manage these sustainability issues are best placed to secure a robust business proposition into the future.

Current situation

Approach to sustainability management

Sustainable development responsibilities are dispersed across the UK rail industry with a wide range of players involved. The following diagram provides a concise overview of the main government and industry stakeholder approaches to sustainability issues. This is focused on statutory responsibilities and main industry responses, but does not assess performance.

Existing good practice

UK rail is responding to many sustainable development issues by developing processes and management systems that aim to minimise negative environmental and social impacts. There is activity across a number of fronts, including:

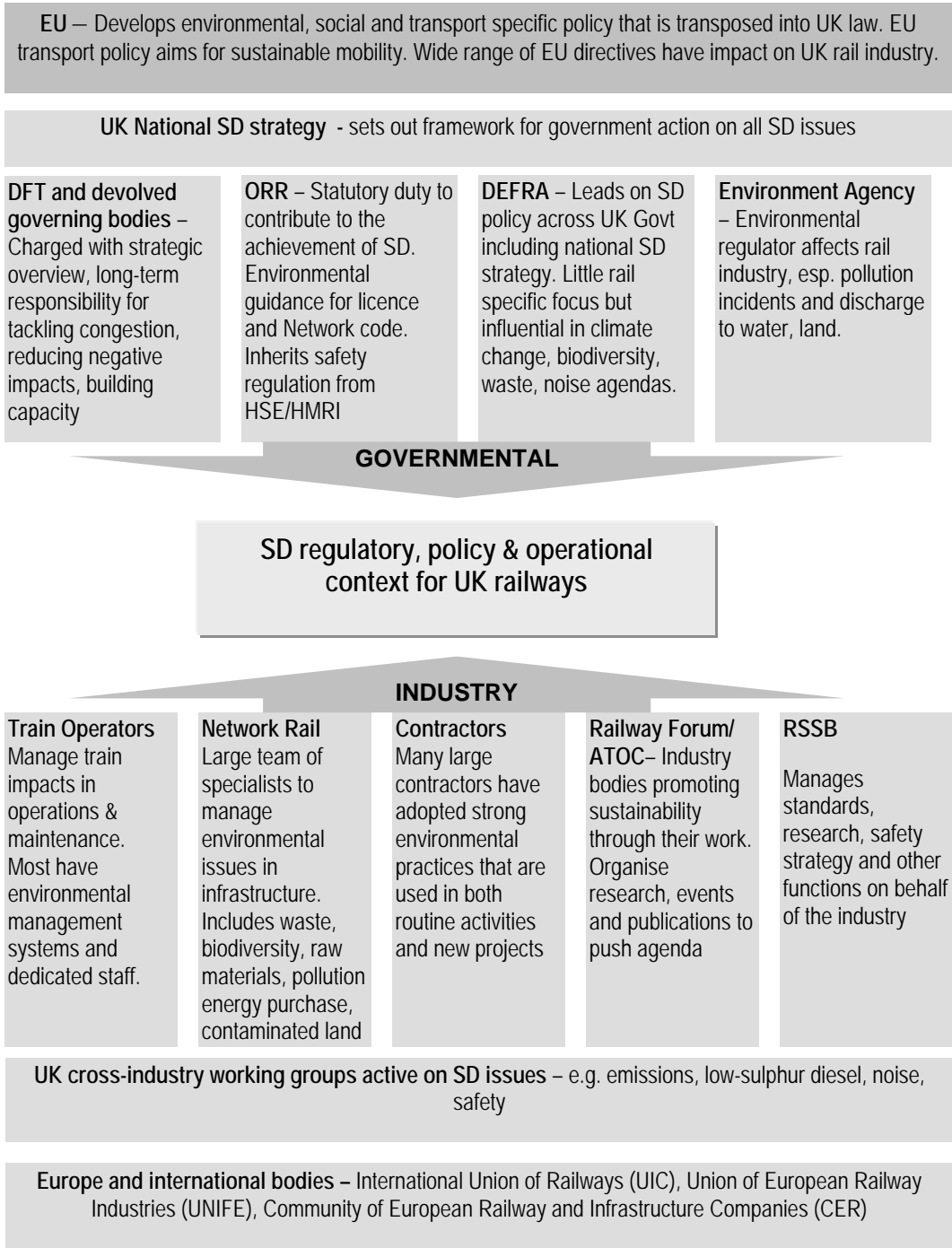
- Procurement – Network Rail's use of Forest Stewardship Council (FSC) certified timber for replacement railway sleepers and minimum environmental requirements for contractors.
- Biodiversity and land-use – Network Rail has been developing a Biodiversity Action Plan and has programmes to manage the numerous Sites of Special Scientific Interest (SSSIs) within its estate.
- Design & construction – sustainability appraisals of significant new projects such as Thameslink 2000.
- Research – collective industry sponsorship of research reports that highlight rail's sustainability benefits, such as Transport 2000's 'The Case for Rail'. Industry contributions to European research on issues such as noise and vibration.
- Technological changes – Limiting the use of ozone-depleting substances in air conditioning and fire extinguishing systems in rolling stock

- Pollution control – Close monitoring by Network Rail and train operators of activities that can potentially release pollutants to air, water and land. Installation of improved pollution control, drainage and water treatment at depots. Agreement between the Environment Agency and Network Rail on the use of herbicides (first voluntary agreement of its kind in Europe).
- Waste minimisation – Train operators minimising their hazardous waste output and recycling other waste streams. Network Rail improving logistics of used ballast disposal to maximise the quantities being sold for reuse and minimise the quantity going to landfill.

The sector has not ignored the sustainable development agenda and there are examples of engaged industry actors, notably The Railway Forum, which organises an annual sustainable development seminar and has produced an industry statement on the issue⁶, and published its 'Rail and the Environment' booklet in partnership with the Association of Train Operating Companies in 2004.

However, there are significant gaps in this response, and a sense that the full potential of cross-industry synergies has not been maximised. The industry has certainly built a strong foundation and is well placed to 'move up a gear' in order to effectively place itself on a path to long-term sustainability.

Current management of SD issues in UK rail

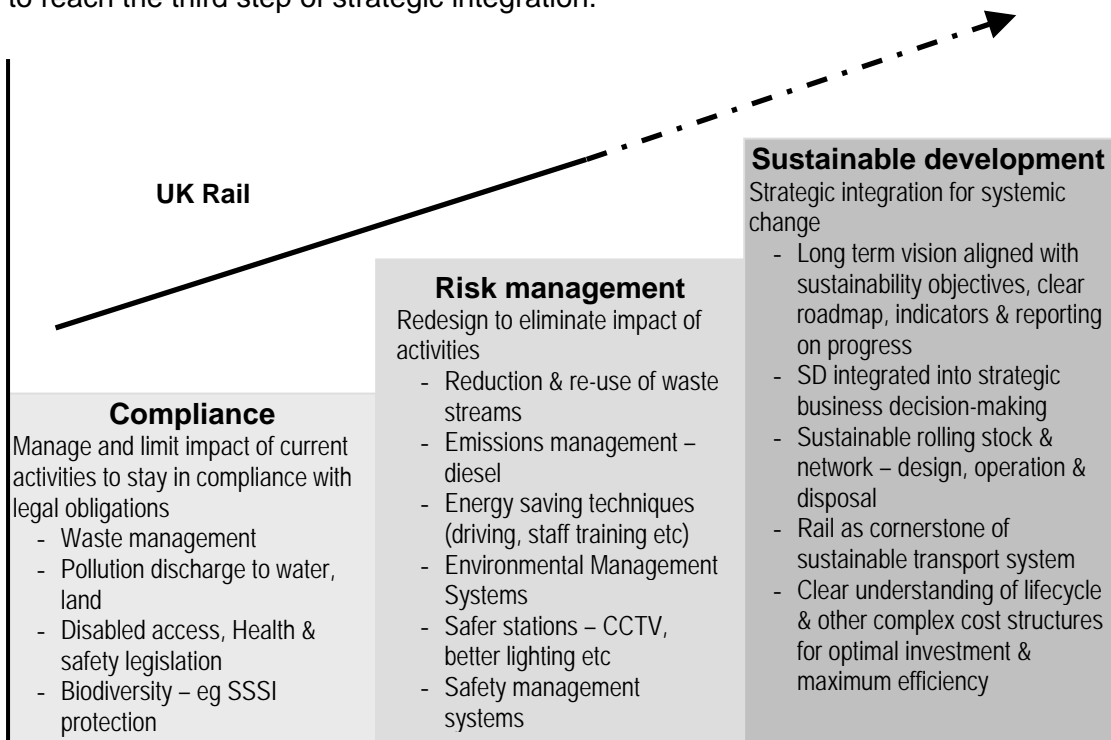


‘Steps to SD’ model

A business or sector response to the challenge of sustainability is usually incremental and develops over time. The response spectrum ranges from defensive denial to compliance through to strategic integration. The UK rail industry is aiming for current compliance and practising some short-term risk management. However a long-term vision and strategy is still missing. There is a risk that if the industry does not seek to reach the next step in its response, it will remain in a reactive zone and constantly be victim to events that affect its operating environment. This could include regulatory threats, changing consumer expectations, tightening standards, changes in public policy and attitudes as well as competition from other modes.

In contrast to UK rail, industry groupings from other sectors are adopting increasingly mature approaches. UKOOA⁷, for example, has developed a sectoral sustainable development strategy that sets out a clear long-term vision, develops a roadmap and relevant indicators with public reporting against these indicators annually. The global cement industry has a Cement Sustainability Initiative co-ordinated by the World Business Council for Sustainable Development (WBCSD), with action plans on key issues. The WBCSD also recently published the findings of its Sustainable Mobility Project, a joint automotive and fuel sector study, which assessed the sustainability of their products and envisioned the future of mobility (although this mainly focuses on road transport).

The diagram below shows three broad steps to sustainable development. It maps some of UK rail’s current activities and gives examples of additional actions required to reach the third step of strategic integration.



Issue gap analysis

Although the industry is increasingly aware of many sustainability issues and is developing a range of responses, in some cases the requirement for short-term compliance can conceal longer-term considerations. Often, however, a more strategic solution can both deliver lasting benefits whilst also fulfilling short-term

compliance needs. The table below shows current responses and possible gaps for some key issues.

Issue	Response	Gap
Exhaust emissions: (limits under NRMM Directive)	<ul style="list-style-type: none"> ○ Ultra Low Sulphur Diesel working group. ○ Some new diesels meet NRMM criteria. 	Full analysis of longer-term emission limits. Many newer trains will not meet limits. Cost of retrofitting, future fuel strategies, capacity to retrofit (flexible design solutions). Longer-term traction energy options are also a key issue which is allied to the debate on electrification. Should the industry concentrate on electrification which is a costly solution and ties their costs to rising electricity prices or look longer term at fuel cell / hydrogen technology?
Energy use: (costs and carbon emissions)	<ul style="list-style-type: none"> ○ Some action on energy saving but limited. ○ Some driver training. ○ Regenerative braking available on new trains but not enabled. 	Implementation of robust energy saving measures. Analysis of rolling stock life cycle energy efficiency, future traction energy sources. Modelling of future energy scenarios. Strategic response to carbon trading.
Noise: (EU noise directive, nuisance regulations etc)	<ul style="list-style-type: none"> ○ Network Rail working with DEFRA to look at the best ways of mapping noise. ○ Railway Forum watching brief on legislative and research developments and putting forward UK rail case where necessary. 	The need for an industry approach to noise that ensures new trains, track maintenance and renewal minimise noise emissions at source, helping to avoid the need for costly and unsightly noise barriers. A lower noise railway is less likely to raise objections to intensification of services and new lines.
Pollution control: (Oil Storage Regs, Water Framework Directive, Ozone Depleting substances (ODS) etc)	<ul style="list-style-type: none"> ○ More widespread use of Environmental Management Systems that encourage more rigorous adoption of (for example) pollution prevention measures, recycling & reuse procedures and systems for minimising hazardous waste streams. 	Whole system solutions (aim to design out waste throughout network) and ensure pollution is captured and treated or removed close to source. Focus on maintenance to minimise release of chemicals through incidents. Restricting hazardous material use.

Customer desirability: Safety, accessibility, security, comfort, amenity, cost	<ul style="list-style-type: none"> ○ CCTV at stations, more security personnel, increased investment in safety measures, new rolling stock, improved information systems, improved disabled facilities/ access. 	Addressing longer term social trends – changing demographics (growing numbers of elderly people). Respond to increased amenities in road transport (e.g. in-car DVD systems). Better marketing of rail's existing sustainability credentials.
Costs & Investment:	<ul style="list-style-type: none"> ○ Cost control measures. There is immense pressure on the industry at present to reduce costs which is being responded to - for e.g. Network Rail taking maintenance in-house and putting cost pressure on their supply chain. ○ Despite this, work done on the railway can cost substantially more than similar work done in a non-railway environment; and some types of work done in the UK railway appear to be considerably more expensive than for other, comparable railways. 	Develop more process efficiency, have clearer understanding of industry cost structures (including sustainability related costs from energy use, compliance costs etc)

Examples of some key areas requiring action

Energy charging

The current traction electricity charging regime is regulated by the ORR as part of the track access charge. This system does not reflect each train's actual electricity usage but employs a model to estimate use by splitting total electricity consumption amongst Train Operating Companies (TOCs) using the TRATIM program. This provides little incentive for any given TOC to reduce costs (and environmental impacts), as the benefits accruing from any energy efficiency measures it implements will be shared with other TOCs. The ORR has been reviewing the structure of track access charges and should explore ways to embed environmental best practice incentives in the charging regime. For example, on-board metering could promote energy saving as cost savings would flow straight back to the bottom line. This could also facilitate implementation of procedural and technological innovations to reduce energy use, such as regenerative braking, improved driving techniques and more efficient rolling stock design.

Network Rail buys traction electricity in bulk for the entire network spending approximately £130m/year, costs that rose 20% in 2004, and were expected to continue to rise by a further 54% in 2005⁸. This rising trend is set to continue over

the medium to long term through rising energy prices as well as market mechanisms designed to internalise the cost of carbon. Therefore mitigating energy price risks through focusing on energy efficiency makes sound business sense.

The Office of Rail Regulation (ORR) will need to take the lead in changing the energy charging regime but will also need the support of other stakeholders, particularly the DfT, devolved governing bodies, train operators and Network Rail.

Rolling stock procurement

The long asset life of rolling stock and the difficulties of retrofitting mean that life cycle sustainability issues can only be properly addressed if they are factored in right at the start of procurement decisions. This contrasts with the motor sector where product turnover is much faster and companies can therefore more quickly respond to technological developments. Rolling Stock Leasing Companies (ROSCOs), however, are starting to examine issues like emissions and energy efficiency as a risk to the residual value of their assets. As long-term investors there is a strong business case for them to consider future operating contexts, particularly in terms of energy costs and emission limits. This also includes complex cost relationships across the wheel-track interface like the wear and tear cost advantages of lighter rolling stock. These types of cost need to be reflected in track access charges to provide an effective incentive framework to influence tender specifications. Danish Railways (DSB) have inserted energy efficiency as an explicit tender stipulation to procure single axle bogies that have achieved a train mass reduction per seat of 34%, which together with the use of regenerative braking and other energy efficiency measures, has led to energy reductions of c.60% per seat⁹.

Currently rolling stock procurement in the UK does not explicitly recognise these concerns. Such processes are starting to emerge in the rest of Europe, with sustainable rolling stock guidelines being developed for both the supply side (eco-design) and demand side (eco-procurement). The International Union of Railway's (UIC) REPID and PROSPER projects provide detailed specifications to include in tender contracts¹⁰. The UK industry needs to access this material and adapt it for its own needs. On the demand side, the regulators need to take the lead in developing new strategies that send market signals to suppliers to innovate for sustainability. The SRA Rolling Stock Strategy does identify environmental performance as a criterion¹¹ but does not include any robust guidance on how to evaluate purchasing decisions.

Franchising conditions

The current franchising structure does not optimise long-term management of assets or enable TOCs to take long-term decisions that have payback timescales beyond the length of the franchise. This has an impact on many sustainability initiatives because average payback periods tend to be longer than the typical 7-year franchise. Extending the franchise period could raise competition policy issues but could also help incentivise TOCs to establish more sustainable operations. Even if franchises remain relatively short term, the franchising regime could be configured to promote sustainability concerns more effectively.

For example, inserting sustainability criteria into franchise contracts, together with a robust monitoring system, should be considered. However, there would need to be a step-change from the current procedure that requires a broad environmental policy

but does not demand any evidence of verifiable performance improvement. Criteria would need to cover responsibilities, evidence that lifecycle impacts have been considered and that franchisees can meet future regulatory conditions. More transparency and accountability in this area could help drive competition between operators in areas of social and environmental performance. A vital part of this would be the development of, and public reporting against, Key Performance Indicators (KPIs) such as energy use, emissions and waste.

Consumer desirability

One of the key challenges facing UK rail is the increasingly competitive range of issues on which transport decisions are made. Some of the most important are affordability, comfort, security, speed, accessibility, reliability, and safety. These issues interact in extremely complex ways, and consumer decisions are made on the basis of numerous factors, some well-informed, some less so. To take just two examples, while road transport is beset with rising congestion problems, car manufacturers have taken an increasingly sophisticated approach to improving the 'in-seat' experience in order to help neutralise the frustration of delays, and while air travel is often a cramped and uncomfortable experience, competitive pricing is a powerful factor in building the airlines' market share.

Rail does, however, have many factors in its favour and it can appeal to various market segments in different ways. Business travellers can make much better use of their journey time by using it for productive work with the additional advantages of far less time spent "waiting to board" and arriving in the centre of cities. The increasing proportion of the population who are elderly and are unable, or unwilling, to travel by car should be looking to rail as an option of first choice. Individuals from economically disadvantaged groups that don't have access to a car need to be offered attractive options by rail. Even the green or ethical consumer who is environmentally aware needs to be convinced that they are 'doing their bit' by taking a transport mode with a demonstrably smaller environmental footprint.

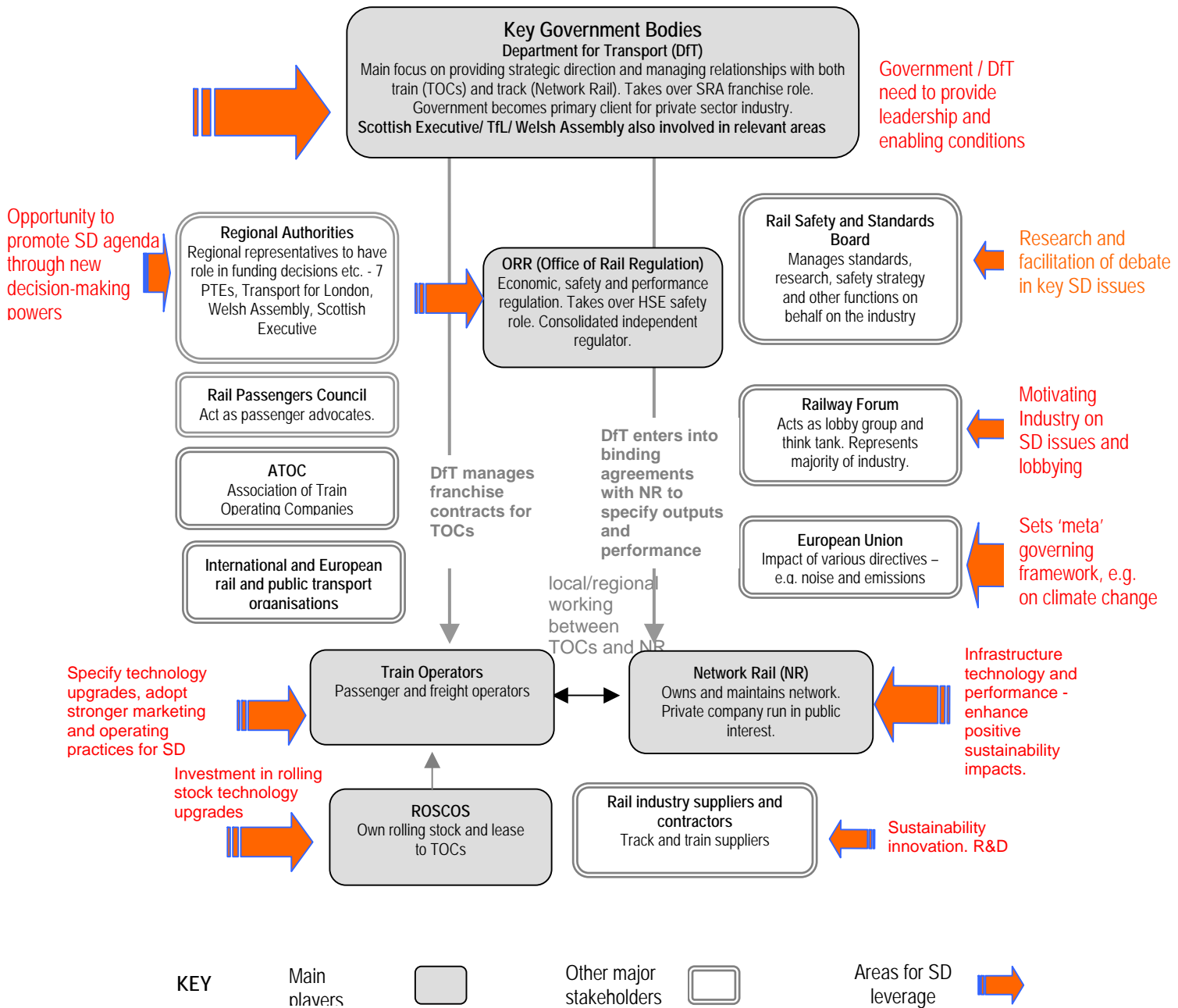
Rail is moving forward on all these fronts, but with innovations such as broadband access on flights and DVD players set in the rear of front car seats for the benefit of back-seat passengers, it is clear that rail needs to constantly innovate to maintain the attractiveness of its offer to consumers. The sector needs to devise strong marketing strategies that complement and communicate a future vision for a sustainable rail system in order to capitalise on the advantages that rail can offer.

Recommendations for action

Giving sustainable development a home

The diagram below maps some of the key sustainability intervention points in the new governing structure of the industry. While all industry players will need to buy into the sustainability agenda and be proactive forces for change in order to deliver a successful strategy, there is a clear need for the Government, the DfT and the devolved administrations to show leadership as they adopt key responsibility for future rail strategy.

Points of SD leverage among rail industry stakeholders



Ultimately, government has to provide long-term leadership to realise the collaborative vision of a sustainable railway, not least since the rail industry is dependent on public funding and operates in a highly complex policy environment controlled by government. Therefore the DfT and the devolved governing bodies need to clearly set out the sustainability outcomes that they want the rail sector to deliver over the short, medium and long term. They must also provide the support, and where necessary financial assistance, to help the industry reach those goals.

United business response

But leadership from government, whether coercive or persuasive, will not succeed unless all the main players in the rail sector also demonstrate the ability and willingness to drive the transition towards a more sustainable railway. While the new industry structure, with greater DfT control, may encourage more sustainable operations through more holistic decision-making across government, this cannot be taken for granted (particularly in light of the devolution of varying powers to other governing bodies across the UK).

There must therefore be no delay in the industry taking the initiative to establish a high-level cross-industry forum that can start working on a vision and strategy that it can present to all its stakeholders. By developing a plan of action, and publicly reporting on its achievements on a regular basis, the rail sector can start to reassert its position at the heart of a sustainable transport system for the UK.

Recommendations

Listed below are recommendations for action, on a 'change agent' by 'change agent' basis. The detail of such actions will need to be further refined by all the relevant actors that need to be involved in each issue.

The recommendations are designed to act as a springboard for a debate that will lead to a robust industry, and Government, response to the challenge of sustainable development.

Government, the devolved governing bodies and the regulator

- In close consultation with industry, the **DfT** and the **devolved governing bodies** should prioritise the development of a clear set of sustainability outcomes that rail should aim to deliver over the short, medium and long term. This needs to reference '*Securing the Future*' – the UK government's sustainable development strategy and the shared strategic framework with the devolved administrations - '*One future – different paths*'¹².
- The **DfT** and the **devolved governing bodies** should provide relevant information, support, and where necessary financial assistance, to help the industry achieve these outcomes
- The **DfT** should ensure that the **ORR** is given a duty to *promote* sustainable development in its regulation of the industry. In particular, sustainability issues (such as climate change) should be considered by the ORR when determining the 'fair and efficient allocation of the capacity of railway facilities' and when reviewing the electricity charging regime.

Cross-industry initiatives

- Regardless of action from government, there needs to be collective action from the rail sector to establish a formal and well-funded **sustainable development group**, co-opting senior industry figures, tasked with:
 - Developing a sustainability vision and strategy for rail
 - Agreeing action to be taken by the industry and individual parties
 - Raising awareness and building capacity in sustainable development across the sector, and engaging in international rail fora
 - Commissioning and collating research on key sustainability issues
 - Championing the case for sustainable railways within government
 - Publicly reporting on improvements in its sustainability performance
- As a priority, this body should construct a more convincing analysis of rail's existing sustainability strengths, and represent them more robustly to key stakeholders - including government, regional transport authorities and the devolved administrations

Specific recommendations for further research and action

(all actions will require collective responses, only lead actors are highlighted in **bold**)

- **Network Rail, Train Operators¹³ and ROSCOs** need to build a vision of the train and the network of the future – for example, assessing different technology, fuel, route and passenger/ freight growth options, and their interactions under different scenarios
- **RSSB and the Railway Forum** should analyse in greater detail the social and economic benefits of rail, including the positive externalities that may be unique to the sector
- Through its R&D programme, the **RSSB**, with **Train Operators, Network Rail and ROSCO's** should plot a route to implementation for operational improvements that could lead to lower emissions and a future energy strategy for the industry, such as implementation of regenerative braking, on-board metering, coasting, driver training, greener fuels, and clean technology transfer.
- **The DfT** and the **devolved governing bodies**, in consultation with the **Train Operators** and **ROSCOs**, need to devise robust sustainability criteria for franchises and train procurement, learning from international best practice
- **Train Operators** need to work together to reinvent the marketing of rail, building on current industry best practice and using the best ideas from other sectors.

Endnotes

¹ 'Securing the Future – UK Government sustainable development strategy', March 2005

² See, for example:

'Towards Sustainability', The UK Automotive Sector, Fifth Annual Report, SMMT 2004

'Striking a Balance 2004', the Sustainability Strategy Update and Progress Report of the UK Oil and Gas Offshore Industry, UKOOA 2004

'Sustainability – broadening the perspective', UK Water Industry Sustainability Indicators, 2002/03

³ Network Rail Corporate Responsibility Report 2003-04 (forthcoming)

⁴ See presentation by Heinrich Strössenreuther, project manager. July 2004 Available at

<http://www.railway-mobility.org/docs/SB20strossenreuther.pdf>

⁵ See UIC *Railways and the Environment; building on the railways' environmental strengths*

http://www.uic.asso.fr/environnement/article.php?id_article=22

⁶ See *Sustainable Development: An Industry Statement* Railway Forum, March 2003

⁷ UK Offshore Operators Association. See 'Striking a Balance: The UK Offshore Oil & Gas Industry Strategy for its Contribution to Sustainable Development 2001' and annual update reports available at

<http://www.ukooa.co.uk/issues/sustainability/introduction.htm>

⁸ Keynote address to the Railway Forum Third Sustainable Development seminar by Ian McAllister, 19 October 2004.

⁹ See project description at [http://www.railway-](http://www.railway-energy.org/tfee/index.php?PROJECTID=15&ID=270&SEL=260)

[energy.org/tfee/index.php?PROJECTID=15&ID=270&SEL=260](http://www.railway-energy.org/tfee/index.php?PROJECTID=15&ID=270&SEL=260)

¹⁰ REPID and PROSPER continue from the RAVEL project that ended in 2001. Further details are available at <http://www.railway-procurement.org/default.htm>

¹¹ *Rolling Stock Strategy*, SRA, December 2003

¹² The new UK Sustainable Development strategy and the strategic framework can both be found at

<http://www.sustainable-development.gov.uk/>

¹³ Train operators refers to both passenger and freight operating companies